

06-16-00

EK 423 578 71105

A

06/15/00

JC851 U.S. PTO

BOX PATENT APPLICATION
ASSISTANT COMMISSIONER FOR PATENTS
WASHINGTON, D. C. 20231

DOCKET NUMBER: AUS0000174US1

Sir:

Transmitted herewith for filing is the Patent Application of:

Inventor: Gary L. Child et al.

For: OPEN ARCHITECTURE GLOBAL SIGN-ON APPARATUS AND METHOD THEREFOR

Enclosed are:

- ☒ Patent Specification and Declaration
- ☒ 5 sheets of drawing(s).
- ☒ An assignment of the invention to International Business Machines Corporation (includes Recordation Form Cover Sheet).
- ☐ A certified copy of a application.
- ☐ An associate power of attorney
- ☐ Information Disclosure Statement, Form PTO 1449 and copies of references

The filing fee has been calculated as shown below:

For	Number Filed	Number Extra	Rate	Fee
Basic Fee				\$ 690.00
Total Claims	42 - 20	22	x 18 =	\$ 396.00
Indep. Claims	3 - 3	0	x 78 =	\$ - 0 -
<input type="checkbox"/> MULTIPLE DEPENDENT CLAIM(S) PRESENTED			+ 260 =	\$ - 0 -
TOTAL				\$ 1,086.00

- ☒ Please charge my Deposit Account No. 09-0447 in the amount of \$ 1,086.00. **A duplicate copy of this sheet is enclosed.**
- ☒ The Assistant Commissioner is hereby authorized to charge payment of the following fees associated with this communication or credit any overpayment to Deposit Account No. 09-0447 **A duplicate copy of this sheet is enclosed.**
 - ☒ Any additional filing fees required under 37 CFR §1.16
 - ☒ Any patent application processing fees under 37 CFR §1.17.

Respectfully submitted,

By:

Jeffrey S. LaBaw

Jeffrey S. LaBaw
Registration No. 31,633
IBM Corporation
Intellectual Property Law Department
Internal Zip 4054
11400 Burnet Road
Austin, Texas 78758
Telephone: (512) 823-0496

::ODMA\PCDOCS\AUSTIN_1\138838\1
368:7047-P356US

JC851 U.S. PTO
09/594518

09594518 06/15/00

AUS-00-0174US1

PATENT

OPEN ARCHITECTURE GLOBAL SIGN-ON
APPARATUS AND METHOD THEREFOR

CROSS-REFERENCE TO RELATED APPLICATION

Related subject matter may be found in the following commonly assigned, co-pending U.S. Patent Application which is hereby incorporated herein by reference: Serial No. _____ (AUS-00-0170US1), entitled "GLOBAL SIGN-ON APPARATUS AND METHOD THEREFOR."

TECHNICAL FIELD

The present invention relates in general to data processing systems, and in particular, to global sign-on technology in data processing systems.

BACKGROUND INFORMATION

Users in an enterprise computing environment typically must access several different systems, each potentially having unique and separate user identifiers (UID) and passwords. Global sign-on technology allows all of the UIDs and passwords to be maintained automatically by the global sign-on system (hereinafter, simply "GSO"). The GSO allows the user to have only a single GSO UID and password. Thereafter, GSO

manages the various UIDs for the target systems that the user needs to access. GSO can automatically start a target application, for example, groupware application or terminal emulation, and log the user into the target system using the appropriate UID and password for that system.

- 5 Current implementations of GSO maintain the GSO "database" within a distributed computing environment. This, however, requires a system manager that wishes to implement a GSO to develop and maintain a distributed computing environment installation. Consequently, there is a need in the art for systems and methods for implementing a GSO in an open architecture environment, for example the
- 10 Internet, while preserving the security afforded by a distributed computing environment.

SUMMARY OF THE INVENTION

5 The aforementioned needs are addressed by the present invention. Accordingly, there is provided, in a first form, a method for global sign-on (GSO). The method includes receiving a user login and determining an existence of a first directory entry corresponding to the user in response to a first Lightweight Directory Access Protocol (LDAP) message. The first directory entry represents a data structure in accordance with a defined LDAP GSO schema. The user is logged into one or more data processing services in response to a corresponding one or more second directory entries also representing a data structure in accordance with a corresponding second predetermined LDAP schema object.

10 There is also provided, in a second form, a computer program product embodied in a tangible storage medium. The program product includes programming for global sign-on (GSO), having instructions for performing the steps of receiving a user login and determining an existence of a first directory entry corresponding to the user in response to a first Lightweight Directory Access Protocol (LDAP) message. Also included are instructions for logging the user into one or more data processing services in response to one or more second directory entries, and wherein each of the first and second directory entries represents a data structure in accordance with a corresponding first and second predetermined LDAP schema object.

15 20 Additionally provided, in a third form, is a GSO data processing system. The system contains circuitry operable for receiving a user login; and circuitry operable for determining an existence of a first directory entry corresponding to the user in response to a first Lightweight Directory Access Protocol (LDAP) message. User are logged into the system via circuitry contained therein operable for logging the user into one or more data processing services in response to one or more second directory entries, and wherein

25

each of the first and second directory entries represents a data structure in accordance with a corresponding first and second predetermined LDAP schema object.

BRIEF DESCRIPTION OF THE DRAWINGS

For a more complete understanding of the present invention, and the advantages thereof, reference is now made to the following descriptions taken in conjunction with the accompanying drawings, in which:

FIGURE 1 illustrates, in block diagram form, a data processing system implemented in accordance with an embodiment of the present invention;

FIGURE 2.1 illustrates, in block diagram form, a Lightweight Directory Access Protocol (LDAP) user schema which may be used in an embodiment of the present invention;

FIGURE 2.2 illustrates an LDAP systems schema which may be used in an embodiment of the present invention;

FIGURE 2.3 illustrates an LDAP computer schema which may be used in an embodiment of the present invention; and

FIGURE 3 illustrates, in flowchart form, a global sign-on (GSO) methodology in accordance with an embodiment of the present invention.

DETAILED DESCRIPTION

The present invention provides a global sign-on system (GSO) and methodology which may be used in an open architecture networked data processing system. The system and method are implemented on a Lightweight Directory Access Protocol (LDAP) GSO schema. The GSO and methods therefore, in accordance with the present invention, use LDAP messages to perform protocol operations on the LDAP objects and attributes as defined in the GSO schema.

In the following description, numerous specific details are set forth such as specific word or byte lengths, etc. to provide a thorough understanding of the present invention. However, it will be obvious to those skilled in the art that the present invention may be practiced without such specific details. In other instances, well-known circuits have been shown in block diagram form in order not to obscure the present invention in unnecessary detail. For the most part, details concerning timing considerations and the like have been omitted in as much as such details are not necessary to obtain a complete understanding of the present invention and are within the skills of persons of ordinary skill in the relevant art.

Refer now to the drawings wherein depicted elements are not necessarily shown to scale and wherein like or similar elements are designated by the same reference numeral through the several views.

Referring first to FIGURE 1, an example is shown of a data processing system 100 which may be used for the invention. The system has a central processing unit (CPU) 110, which is coupled to various other components by system bus 112. Read only memory ("ROM") 116 is coupled to the system bus 112 and includes a basic

input/output system ("BIOS") that controls certain basic functions of the data processing system 100. Random access memory ("RAM") 114, I/O adapter 118, and communications adapter 134 are also coupled to the system bus 112. I/O adapter 118 may be a small computer system interface ("SCSI") adapter that communicates with a disk storage device 120. Communications adapter 134 interconnects bus 112 with an outside network enabling the data processing system to communicate with other such systems. Input/Output devices are also connected to system bus 112 via user interface adapter 122 and display adapter 136. Keyboard 124, track ball 132, mouse 126 and speaker 128 are all interconnected to bus 112 via user interface adapter 122. Display monitor 138 is connected to system bus 112 by display adapter 136. In this manner, a user is capable of inputting to the system throughout the keyboard 124, trackball 132 or mouse 126 and receiving output from the system via speaker 128 and display 138.

Preferred implementations of the invention include implementations as a computer system programmed to execute the method or methods described herein, and as a computer program product. According to the computer system implementation, sets of instructions for executing the method or methods are resident in the random access memory 114 of one or more computer systems configured generally as described above. Until required by the computer system, the set of instructions may be stored as a computer program product in another computer memory, for example, in disk drive 120 (which may include a removable memory such as an optical disk or floppy disk for eventual use in the disk drive 120). Further, the computer program product can also be stored at another computer and transmitted when desired to the user's work station by a network or by an external network such as the Internet. One skilled in the art would appreciate that the physical storage of the sets of instructions physically changes the

medium upon which it is stored so that the medium carries computer readable information. The change may be electrical, magnetic, chemical, biological, or some other physical change. While it is convenient to describe the invention in terms of instructions, symbols, characters, or the like, the reader should remember that all of these and similar terms should be associated with the appropriate physical elements.

Note that the invention may describe terms such as comparing, validating, selecting, identifying, or other terms that could be associated with a human operator. However, for at least a number of the operations described herein which form part of at least one of the embodiments, no action by a human operator is desirable. The operations described are, in large part, machine operations processing electrical signals to generate other electrical signals.

FIGURES 2.1, 2.2 and 2.3 illustrate LDAP GSO schema that may be used with the present invention. LDAP is a standardized protocol that is used to provide directory access. LDAP version 2 is specified in Request for Comments (RFC) 1777, March 1995, which is hereby incorporated herein by reference. LDAP version 3 is specified in RFC 2251, (Copyright 1997 by The Internet Society), which is also hereby incorporated herein by reference. (RFCs are Internet publications that constitute the principal means by which standards are promulgated.) In LDAP, protocol operations are encapsulated in an LDAP message exchanged over the network between the client requesting the directory access service, and a server providing the directory access service. Directory entries include a set of attributes. An attribute type definition specifies the sets of values that an attribute of that type may take, the syntax to which the values must conform and the kinds of operations that may be performed on the values of that attribute type. An object class is a container class of a set of attribute types. The definition of a particular

object class specifies the attribute types associated with an instance of the object class. Object classes may themselves contain sub-objects. The relationship between an object and its sub-objects, if any, is essentially a parent-child relationship, although, an object type can inherit the attribute types of the parent. An LDAP schema is a collection of attribute type definitions, object class definitions and other information which a server uses to perform operations on the directory entries in association with asserted attribute values. The LDAP schema used to implement GSO, the LDAP GSO Schema, are illustrated in FIGURES 2.1, 2.2 and 2.3.

Directory entries in LDAP are instances of particular defined object types. Object class definitions for objects that may be used with the present invention are included in Appendix A. Object classes may be derived from superclasses, including classes defined in the LDAP specifications discussed above. Directory entries are hierarchical and the parents may have associated therewith another entry, the child, which parent/child relationship is exploited by LDAP directory operations. Referring now to FIGURE 2.1, there is illustrated therein a GSO schema for a user portion 200 of an LDAP GSO schema in accordance with the principles of the present invention.

An *eGSOuser* class object 204 is associated with an *ePerson* class object 202. The *eGSOuser* object 204 is a child entity of the *ePerson* object 202. The *eGSOuser* class object 204 is a container class containing user specific information for the subset of users that are enabled for GSO. An *eGSOuser* object 202 may include a *userType* attribute and a *userState* attribute. The *userType* indicates the type of user and reflects the access available to the corresponding user. In an embodiment of the present invention these may be, for example, Senior Administrator, Administrator, Middle Tier Server, Full User, and User. These *userType* attribute values are associated with levels

of access to GSO data in the directory. A Senior Administrator has access to be able to manage all GSO data and also access to create other administrators (i.e. create instances in the directory of *eGSOuser* objects having a *userType* attribute value of "Administrator.") An Administrator has access to be able to manage all GSO data but cannot create other administrators. A Middle Tier Server has access to read all GSO data but cannot update GSO data. (A user of Middle Tier server *userType* may operate on behalf of multiple clients, so must be able to read everything.) A Full User has access to read and write that user's (the user associated with the corresponding instance of *eGSOuser* object), data, including, for example, passwords. Thus, such a user may update its passwords. Users have only read access, and thus, cannot update GSO data. In other words, a User cannot change its password, for example.

The *userState* attribute indicates the current state for the user. In an embodiment of the present invention, possible values are "Enabled" and "Disabled." In this way, a user may be disabled for GSO without having to delete the *eGSOuser* instance associated with the disabled user. Additionally, *eGSOuser* derives the *commonName* attribute ("cn") from the *ePerson* class 202. The *commonName* attribute contains the name of an object, and in the *ePerson* class 202, the *commonName* attribute contains a value corresponding to the name of a person. Thus, in an instance of an *ePerson* object class 202 for a given user, the value contained in the *commonName* attribute corresponds to the name of the given user. The *commonName* attribute is defined in the standard LDAP user schema, implemented by all LDAP enabled data processing systems. The definition of the LDAP user schema is specified in RFC 2256, entitled "A Summary of the X.500(96) User Schema for Use with LDAPv3", (Copyright 1997, The Internet Society) and hereby incorporated herein by reference.

5 The *eGSUser* class object 204 may contain additional attributes. These are omitted from the illustration from FIGURE 2.1 for clarity. However, Appendix A includes a table of all object class definitions, including the attribute types which may be contained by the object class. Additionally, the definitions of GSO attributes may be found in the attribute tables in Appendix B. Attributes in accordance with the standard LDAP user schema are found in RFC 2256. These include, for example, the surname attribute ("*sn*") which contains the family name of a person, a *userPassword* attribute and the *description* attribute which contains a human-readable description of the associated object. It would be understood by an artisan of ordinary skill that particular attributes may be designated as being optional in the standardized LDAP user schema whereby particular implementations of the schema may omit those attributes. Similarly, alternative embodiments of the GSO schema may implement those attributes designated in the attribute tables as optional, or, alternatively, omit implementation of optional attributes. It would be further understood by an artisan of ordinary skill that alternative embodiments may selectively implement optional attributes. An artisan of ordinary skill in the pertinent art would recognize that such data processing systems and methods in accordance with the principles of the GSO schema herein would be within the spirit and scope of the present invention.

20 An *eGSUser* class object 204 has associated one or more *eTargetRecord* class objects 206. The *eTargetRecord* objects 206 describe the target that a *eGSUser* may launch. An *eTargetRecord* object 206 may contain several attributes. These are provided in the class definition in Appendix A. These include the *targetAdapter*, *reqIdentifier*, *optIdentifier*, *uid*, *userPassword*, *launchable* and *autoInitiate* attributes.

The value of the *userid* (*uid*) attribute contains a predetermined user identifier

string (UID) for the corresponding target. The syntax is adopted from the X.500 directory schema and is specified in RFC 1274, November 1991, hereby incorporated herein by reference. The corresponding user password is the value of the *userPassword* attribute for the target associated with the *eTargetRecord* object. The syntax of the attribute is defined in RFC 2256. The definitions of the remaining of the aforesaid attributes are included in Appendix B. Each of these attributes will be further discussed in conjunction with FIGURE 3 hereinbelow, and because, as discussed herein above, in alternative embodiments, optional attributes may be selectively omitted.

An *eTarget Record* object 206, may have associated an *eGSOattachment* 208 class object is used by the GSO to provide additional data relevant to the *eTarget Record* object 206 containing it. The attachment data in the *eGSOattachment* object may have associated additional files or information needed by the target. An example might be "INI" files. An *eGSOattachment* object may also be maintained in a GSO-specific object subtree beneath a corresponding *eTarget Service* class object, and *eTargetAdapter* class object, or an *eGSOmachineProfile* class object, each of which are discussed herein below.

An *eGSOattachment* object may contain one or more attributes. One *eGSOattachment* object includes a *Property Type* attribute. The definition of such attribute is the *Property Type* attribute. The values of the *Property Type* attribute, which may include multiple values, indicates the type of attachment that is contained in the *eGSOattachment* object. Note that attributes within the LDAP may take a set of values, that is, be multi-valued. Additional attributes which *eGSOattachment* objects 208 may take are indicated in the full definition provided in Appendix A. Attribute definitions are specified in Appendix B.

Refer now to FIGURE 2.2 illustrating a GSO schema for a systems portion 210 of an LDAP GSO schema in accordance with the principles of the present invention. Systems hierarchy 210 includes an *eApplicationSystem* class object 212. An *eApplicationSystem* 212 will be a container object or "anchor point" for a plurality of GSO schema subtrees. Additionally, *eApplicationSystem* object 212 may include one or more attributes. These are specified in the object class definition in Appendix A. For example, the value of *systemName* attribute represents the system name corresponding to the *eApplicationSystem* object. The *eApplicationSystem* object is derived from the Common Information Model (CIM) promulgated by the Distributed Management Task Force (DMTF). Exemplary systems that might be represented by an *eApplicationSystem* object 212 are discussed in the LDAP IMPLEMENTATION COOKBOOK by HEINZ JOHNER, ETAL. (Copyright 1999, International Business Machines Corporation), which is hereby incorporated herein by reference. CIM provides a set of classes with properties and associations that comprise a conceptual framework for organizing information about a managed environment. The structure of the CIM is described in the common information model (CIM) specification, version 2.2 which is hereby incorporated herein by reference. CIM defines schema for managed elements in a system. The managed elements may include physical objects such as computer systems. CIM is structured into a core model and a common model. The core model is an information model that captures notions that are applicable to all areas of management, while the common model is an information model that captures notions common to particular management areas, but independent of a particular technology or implementation.

As previously mentioned, *eApplicationSystem* object 212 contains a plurality of GSO subtrees, each of which is anchored by a *container* class object 214. The definition

of the *container* class is included in Appendix A. The *container* class is derived from the *top* class, one of the two abstract classes that every entry contains, in accordance with the LDAP specification. Each *container* object 214 includes a *cn* attribute, the value of which indicates the type of GSO subtree for which the corresponding *container* object 214 is the anchor point. (In FIGURE 2.2, the label "cn" is omitted from the common name indicated inasmuch as in the embodiment of FIGURE 2.2, container objects 214 include only the *cn* attribute.)

The *accessGroups container* object 214 contains a plurality of *accessGroup* objects 216. The *accessGroup* object 216 may have a format that is the same as *groupofNames* objects 218, described below. Each *accessGroup* object 216 may include a *member* attribute defined in Appendix B. The *member* attribute is multivalued. The values in a *member* attribute contain the list of entities having the corresponding level of access. In the embodiment illustrated in FIGURE 2.2, five *accessGroup* objects 216 are shown, corresponding to five access levels. The access levels in the embodiment of FIGURE 2.2, as previously, described are Senior Administrator ("Senior Admin"), Administrator ("Admin"), Middle Tier Servers, and Full User and User. Additionally, *accessGroup* objects for customer-defined subadministration groups may be provided, for example, *accessGroup* objects 216 labeled Group A and Group B in FIGURE 2.2. Each of Group A and Group B *accessGroup* objects includes a corresponding *groupofNames* object 218. The *groupofNames* object is defined in the standard LDAP schema as summarized in RFC 2256.

Target groups *container* object 214, is the "anchor point" for the GSO-specific target groups. A GSO administrator may define groups of target types and give users access to those target groups. *GroupOfNames* objects 218 labeled Target Group A and

Target Group B in FIGURE 2.2, are used to define the target groups specified by the administrator. Although two target groups are illustrated in the scheme of FIGURE 2.2, it would be understood by an artist of ordinary skill that this is exemplary, and in general, an embodiment of the present invention may have a number, n , of target groups defined. The GSO Domains *container* object is used as an "anchor point" for the GSO domains subtree. The GSO Domains *container* is a *container* object for a plurality of *eGSODomain* 220 objects that are used by GSO to determine the authentication domain for a specified location string. Within a multi-user networked computing environment, various authentication domains (administrative realms) may be implemented. These domains may be distinguished with combinations of identifiers and values. For example, identifiers may include host, application and application instance. A value associated with each of these then specifies a particular host, application, and application instance. The combination of identifiers and values are referred to as location strings. The *eGSODomain* object is used to configure the possible location strings valid for a particular domain. GSO uses the *eGSODomain* object to determine the authentication domain for a specified location string, and uses that to look up a users target record within that authentication domain.

The target accounts *container* object is used as the "anchor point" for the GSO specific target accounts. GSO may define and maintain accounts which may be shared between users, targets or both. For example, if a user defines a target of Telnet to access a particular machine and also defines a target of FTP for the same machine, they may, in an embodiment, in accordance with the principles of the present invention, share the same target account information. (Telnet and File-Transfer Protocol (FTP) are Internet protocols for network terminal emulation and file transfers, respectively.) The target

accounts *container* object is a container for *eGSOaccount* objects 222. Although only a single *eGSOaccount* object 222 is illustrated in FIGURE 2.2, for clarity, it would be understood by an artist of ordinary skill that the target accounts container may include one or more of *eGSOaccount* objects 222.

5 The *eGSOaccount* object is used by GSO to describe target account information which may be shared by multiple users or a cross multiple targets for a single GSO user, as previously indicated. The complete class definition for the *eGSOaccount* class is included in Appendix A.

10 The target service types *container* object is used as the "anchor point" for GSO-specific target service types. A target service type is a class of services representing a specific type. Examples might include Lotus Notes®, Netware and tn3270 terminal emulation. (Lotus Notes® is a registered trademark of Lotus Development Corporation.) Objects of the *eTarget Service Type* class may include a plurality of attributes which are specified in the corresponding object class table in
15 Appendix A. The attribute specifications are provided in Appendix B, and for standard LDAP attributes, in the aforementioned RFC's, previously incorporated herein by reference.

20 The *eTarget Service Type* objects 224 includes a *tsType* attribute. The value of the *tsType* attributes indicates the type of target service for a GSO target. Other attributes which *eTarget Service Type* object 224 may contain have not been illustrated in Figure 2.2 for simplicity. However, the object class definition for *eTarget Service Type* objects includes a list of attributes which such objects may contain. These are listed in Appendix A.

25 Instantiations of a particular target service type are described using objects 226 of the *eTarget Service* class. The full class definition is provided in the corresponding

object class table, Appendix A. In FIGURE 2.2, a single *eTargetService* object 226 is illustrated for simplicity, however, it would be understood that this is exemplary and an alternative embodiment may include a plurality of *eTargetService* objects 226. Furthermore, *eTargetService* objects 226 may include a plurality of attributes. Two attributes illustrated in FIGURE 2.2 are the *tsType* discussed above, and the *tsName* attribute. The value of the *tsName* attribute is used to specify the name of the particular target service that is an instance of the corresponding target service type. An instance of a *target service type* might be, for example, tn3270 terminal emulation service to a particular data processing system. In *eTargetService* object 226 may also contain one or more *eGSOattachment* objects 208. These *eGSOattachment* objects may be used to provide additional data relative to a specific target service type, in the same way that they are used to provide additional data to target records, previously described in conjunction with FIGURE 2.1.

In an embodiment in which the GSO schema in accordance with the principles of the present invention is a Java based implementation, an *eTargetServiceType* object 224 may contain one or more *eTargetAdapter* objects 228. An *eTargetAdapter* object 228 may include a plurality of attributes. The attribute list for an *eTargetAdapter* object is provided in the class definition included in Appendix A. Attributes may include a *taName* attribute, the value of which allows a user to specify the name of a target adapter. Target adapters are code used to access the specific target of the type specified by the value of the *tsType* attribute previously discussed in conjunction with *eTargetServiceType* 224. If the client itself is a pure Java client, then the target adapter code is the client itself. Otherwise, the target adapter code interfaces with the client code such as a command line executable or native code. An example of the last might be a

native telnet tn3270 emulator that is called by Java glue code that constitutes the target adapter code. On the other hand, a pure Java tn3270 emulator that runs in a browser, for example, represents a pure Java client that may itself embody the target adapter code. Additionally, an *eTarget Adapter* object 228 may include a *javaClassName* attribute. This attribute is used to indicate the java class name which GSO uses to access the specific target. The definitions of the *taName* and *javaClassName* attributes, as well as the other attributes that an *eTargetAdapter* object may include and not illustrated on Figure 2.2 for simplicity, are included in the attribute tables, Appendix B.

Similar to *eTargetService* objects 226 and *eTargetRecord* objects 206, an *eTarget Adapter* object 228 may include one or more *eGSOattachment* objects 208. As previously described, *eGSOattachment* objects 208 are used to provide additional data relevant to, in this instance, a specific target adapter. For example, if the target service type is a telnet tn3270 emulation, (corresponding, for example, to a *tsType* attribute value of "3270") to log a user into the session, the service has to be aware of the logon panel to use. An instance of *eGSOAttachment* object 208 may be used to describe the panel, that is, the respective fields therein, so that the GSO can properly pass the user name and password.

An *eObject Description* object 230 is provided to describe additional information about identifiers where attachments associated with an *eTargetServiceType* object or an *eTargetAdapter* object. The information within an *eObjectDescription* object, allows detailed information to be associated with these objects, for example, descriptive text which can be presented to a graphical user interface (GUI). For example, text that may be displayed to a user in a native language. By using the stored text in the *eObjectDescription* object associated with the *eTargetServiceType* defining the

corresponding native language service, the appropriate text is displayed. A plurality of attributes may be included in an *eObjectDescription* object 230. These are listed in the corresponding class definition in Appendix A. Attributes that may be contained by an *eObjectDescription* object 230 include the *required* and *editable* attributes. These take Boolean values which indicate whether the object is required or if it is editable by the user. An *eObjectDescription* object 230 may also include an *objectClassCaption* attribute defined in Appendix B.

The Password Generators *container* object is used as the "anchor point" for the GSO-specific *ePassword Generator* objects 232. The *ePassword Generator* objects 232 describe the generator information used for targets which are configured to use a generated password instead of a fixed password. Generated passwords mitigate against security compromise by interception of a user's password. An *ePasswordGenerator* object 232 describes the algorithm used to dynamically generate a password each time a user logs on. (A dynamically generated password may also be called a passticket or a token.) The algorithm is also available to the host, or target. The token is generated using the algorithm in response to an encryption key as well as the UID and, in particular embodiments, other information, such as a client machine identifier. Additionally, dynamic information, for example the time of day is used so that the token is different each time the user logs on. The host and client both generate the token using the same information and algorithm. The client passes the token so generated to the host, and if the two tokens compare, access to the host is granted.

Attributes which may be contained by an *eObjectGenerator* object 232 include the *secret Key* attribute. The value of the *secret Key* attribute contains an encryption key used in the generation of a pass ticket or password. The mechanism used for the

encryption may be application specific and may be indicated within the key itself. The definition of the *secret Key* attribute is included in the attribute tables appearing in Appendix B.

An *ePassword Generator* object 232 may also contain a *groupofNames* object 218. The *groupofNames* object 218 may include attributes, such as the *targetuid*, whose values represent information needed to generate the token.

Referring now to FIGURE 2.3, there is illustrated therein Computers portion 240 of an LDAP GSO schema in accordance with the principles of the present invention. An *eComputerSystem* object 242 is used to represent either a single computer system or a class of computer systems within the GSO. If an *eComputer System* object 242 does not yet exist, when a computer system is defined by GSO, it will be created. An *eComputerSystem* object 242 represents an object type defined by the CIM. The *eComputer System* object is derived from the CIM. Within the CIM Core Specification, incorporated herein by reference, is defined a *CIMComputerSystem* object upon which *eComputer System* 242 is based.

An *eComputer System* object 242 may be associated with one or more *eSoftware* objects 244 (in FIGURE 2.3, only a single *eSoftware* object is shown for simplicity). The *eSoftware* objects 244 may be derived from the *CIMLogicalElement* defined in the *CIMCore* schema specification. An *eSoftware* object 244 may include one or more attributes. Attributes which an *eSoftware* object may include are listed in the *eSoftware* object definition included in Appendix A. The *software* attribute, which may contain as a value a name used to identify software object entries, is shown in FIGURE 2.3; other attributes that may be included have been omitted for clarity. Recall that attributes that an *eSoftware* object may contain, include those attributes derived from superclasses of

the object. Definitions of attributes not so derived are included in Appendix B. Associated with an *eSoftware* object 244 may be an *eGSOMachineProfile* object 246. The *eGSOMachineProfile* object is used in GSO to describe GSO-specific information about the computer system specified by using the *eComputer System* object 242 discussed herein above. An *eGSOMachineProfile* 246 may include a plurality of attributes. These attributes are listed in the class definition corresponding to the *eGSOMachineProfile* object class in Appendix A. An *eGSOMachineProfile* object 246 may have one or more *eGSOattachment* objects 208 which represent GSO-specific files or locations of files for targets. *eGSOattachment* objects 208 have been previously discussed in conjunction with FIGURES 2.1 and 2.2.

Refer now to FIGURE 3 illustrating a GSO methodology 300 using the GSO LDAP schema according to the principles of the present invention. In step 302, user login is received. In step 304 it is determined for an instantiation of an *eGSOuser* object corresponding to the user whose login is received in step 302 exists. If not, the user is not enabled for GSO and methodology 300 terminates. Note that in an embodiment of the present invention in which *eGSOuser* objects are implemented in accordance with the schema illustrated in FIGURE 2.1, corresponding to an *eGSOuser* object 202, an instantiation of the *eGSOuser* object with the value of the *cn* attribute corresponding to the name of the user will exist. Then, step 304 proceeds by the "Yes" branch, and in step 306 it is determined if the user is an "active" GSO user. In an embodiment in accordance with the schema illustrated in FIGURE 2.1, step 306 may be performed by retrieving the value of the *userState* attribute. As previously discussed, and as shown in the attribute definition, Appendix B, possible values for the *userState* attribute may be "Enabled" and "Disabled". If, in such an embodiment, the value is determined in step 306 to be

"Disabled", then the user is not an active GSO user and step 306 proceeds by the "No" branch, and methodology 300 terminates. Conversely, if the value is "Enabled" then in step 306 is an active GSO user, and methodology 300 proceeds to step 308.

5 In step 308 it is determined if the *eGSOuser* object as determined in step 304 includes any *eTargetRecord* objects. If not, methodology 300 terminates (the "No" branch in step 308.) Otherwise, in step 310 the next *eTargetRecord* is read. Recall that, as discussed in conjunction with FIGURE 2.2, an *eGSOuser* object may contain one or more *eTargetRecords*, corresponding to the number of targets for which a particular target is GSO enabled. By looping over the *eTargetRecord* objects, steps 308-340, methodology 300 logs the particular user under multiple targets as will now be described in further detail.

10 In step 312, it is determined if the target corresponding to the *eTargetRecord* object record read in step 310 is "launchable". This may be determined in an embodiment in accordance with the GSO schema illustrated in FIGURES 2.1-2.3 by referring to the *launchable* attribute in the *eTargetRecord*. As described in Appendix B, the *launchable* attribute may take Boolean values, whereby a *launchable* target is represented by a "True" value for the *launchable* attribute, and "False" otherwise. If the target is not *launchable*, step 312 proceeds by the no branch to loop to the next *eTargetRecord*.

15 20 If, however, in step 312 the target is *launchable*, it is then determined in step 314 if the target is an auto initiated target. The *eTargetRecord* read in step 310 may include an *autoInitiate* attribute that may take a Boolean value. If the value of the *autoInitiate* attribute is "TRUE" then the corresponding target should be launched when the GSO

user logs on. If, however, the value of the *autoInitiate* attribute is "FALSE" then step 314 follows the "No" branch and returns to step 308.

If, however, in step 314 the target may be auto initiated, then it is determined in step 316 if the target has prerequisites, and if the last prerequisite has not been handled. Prerequisite targets are listed in a *prereqTarget* attribute in the *eTargetRecord* read in step 310. If the target corresponding to the *eTargetRecord* read in step 310 includes prerequisite targets then methodology 300 loops over the prerequisite targets by proceeding to step 318 to obtain the name of the next prerequisite target in the *prereqTarget* attribute. In step 320, the *eTargetService* object for the corresponding prerequisite target is read. Recall that an *eTargetService* object, such as an *eTargetService* object 226 discussed in conjunction with FIGURE 2.2, may include a *reqIdentifier* attribute, the values of which specify required identifiers for the corresponding GSO target. If the target has any required identifiers, the required identifiers are read from the *eTargetService* object in step 324. Otherwise, step 324 is bypassed. Similarly, in step 326 it is determined if the target specifies optional identifiers. If so, in step 328, the optional identifiers are read from the *eTargetService* object, step 328. If, conversely, the target does not include optional identifiers, step 328 is bypassed.

In step 330, the *eTargetAdapter* object referenced by the *eTargetRecord* object for the current target is read. Recall that the *eTargetAdapter* object 228 in an embodiment in accordance with FIGURE 2.2, describes the interface code which GSO uses to access the current target. In step 322, the initialization routine of the *eTargetAdapter* read in step 330 is invoked, passing required and optional identifier values, if any, retrieved in steps 324 and 328, respectively.

In step 334, the target is started. The value of the *uid* attribute and *userPassword* attribute are read from the corresponding *eTargetRecord*, in step 336. The values of the *uid* and *userPassword* attributes respectively contain the user identifier and password for the active GSO user initiating the login in step 302. In step 338, the user is logged into the target using the values of the *uid* and *userPassword* attributes retrieved in step 336. If the current target is a prerequisite target, in step 340, step 340 proceeds by the yes branch to step 317. If, however, in step 340 the current target was not a prerequisite target, methodology 300 returns to step 308 to process the next *eTargetRecord* object.

In this way, a GSO may be provided. The GSO implemented in accordance with the present invention rests on a set of data structures built on a schema derived from the open architecture LDAP.

Although the present invention and its advantages have been described in detail, it should be understood that various changes, substitutions and alterations can be made herein without departing from the spirit and scope of the invention as defined by the appended claims.

WHAT IS CLAIMED IS:

1 1. A method for global sign-on (GSO) comprising the steps of:
2 receiving a user login;
3 determining an existence of a first directory entry corresponding to said user in
4 response to a first Lightweight Directory Access Protocol (LDAP) message; and
5 logging said user into one or more data processing services in response to one or
6 more corresponding second directory entries, and wherein each of said first and second
7 directory entries represents a data structure in accordance with a corresponding first and
8 second predetermined LDAP schema object.

1 2. The method of claim 1 wherein each of said corresponding second predetermined
2 LDAP schema objects has one or more predetermined attributes, each of said one or
3 more attributes having a set of one or more values, and wherein a first one of said
4 plurality of attributes is operable for initiating a corresponding one of said data
5 processing services.

1 3. The method of claim 2 wherein said step of logging said user into one or more
2 data processing systems is in response to first one of said plurality of attributes having
3 a first predetermined data value.

1 4. The method of claim 1 wherein said step of logging said user into said one or
2 more data processing services comprises the steps of:

1 for each data processing service, reading a user identifier (UID) and a password
2 from a corresponding one of said second directory entries; and
3 logging in said user using said UID and said password.

1 5. The method of claim 1 further comprising the step of starting said one or more
2 data processing services in response to one or more third directory entries, each of said
3 third directory entries representing a data structure in accordance with a corresponding
4 third predetermined LDAP schema object.

1 6. The method of claim 5 further comprising the step of invoking an initialization
2 routine corresponding to each of said data processing services, wherein each of said
3 corresponding third predetermined LDAP schema objects includes a set of one or more
4 attributes, and wherein said initialization routine is determined in response to a value of
5 a first attribute of said set of one or more attributes.

1 7. The method of claim 1 wherein said step of logging said user into one or more
2 data processing services includes the step of determining if a first one of said data
3 processing services requires a prerequisite service.

1 8. The method of claim 7 wherein each of said corresponding second predetermined
2 LDAP schema objects has one or more predetermined attributes, each of said one or
3 more attributes having a set of one or more values, and wherein determining if said first
4 one of said data processing services requires a prerequisite service is in response to a
5 preselected value of a first one of said one or more attributes.

1 9. The method of claim 1 wherein said step of logging said user into one or more
2 data processing services includes the step of determining if a first one of said data
3 processing services takes an identifier value.

1 10. The method of claim 9 wherein determining if a first one of said data processing
2 services takes an identifier value is in response to a fourth directory entry, said fourth
3 directory entry representing a data structure in accordance with a corresponding fourth
4 predetermined LDAP schema object.

1 11. The method of claim 10 wherein said fourth predetermined LDAP schema object
2 has one or more predetermined attributes, each of said one or more attributes having a
3 set of one or more values, and wherein determining if said first one of said data
4 processing services takes an identifier value is in response to a preselected value of a first
5 one of said one or more attributes.

1 12. The method of claim 11 further comprising the step of invoking an initialization
2 routine corresponding to said first data processing service in response to an attribute
3 value in a third directory entry corresponding to said first data processing service, said
4 third directory entry representing a data structure in accordance with a corresponding
5 third predetermined LDAP schema object, said initialization routine being determined
6 in response to said attribute value, and wherein said identifier value is passed to said
7 initialization routine.

1 13. The method of claim 9 wherein said identifier value is a required identifier value.

1 14. The method of claim 9 wherein said identifier value is an optional identifier
2 value.

15. A computer program product embodied in a tangible storage medium, the program product including programming for global sign-on (GSO), the programming comprising instructions for performing the steps of:

receiving a user login;

determining an existence of a first directory entry corresponding to said user in response to a first Lightweight Directory Access Protocol (LDAP) message; and

logging said user into one or more data processing services in response to one or more second directory entries, and wherein each of said first and second directory entries represents a data structure in accordance with a corresponding first and second predetermined LDAP schema object.

16. The computer program product of claim 15 wherein each of said corresponding second predetermined LDAP schema objects has one or more predetermined attributes, each of said one or more attributes having a set of one or more values, and wherein a first one of said plurality of attributes is operable for initiating a corresponding one of said data processing services.

17. The computer program product of claim 16 wherein said step of logging said user into one or more data processing systems is in response to first one of said plurality of attributes having a first predetermined data value.

18. The computer program product of claim 15 wherein said step of logging said user into said one or more data processing services comprises the steps of:

3 for each data processing service, reading a user identifier (UID) and a password
4 from a corresponding one of said second directory entries; and
5 logging in said user using said UID and said password.

1 19. The computer program product of claim 15 further comprising the step of starting
2 said one or more data processing services in response to one or more third directory
3 entries, each of said third directory entries representing a data structure in accordance
4 with a corresponding third predetermined LDAP schema object.

1 20. The computer program product of claim 19 further comprising the step of
2 invoking an initialization routine corresponding to each of said data processing services,
3 wherein each of said corresponding third predetermined LDAP schema objects includes
4 a set of one or more attributes, and wherein said initialization routine is determined in
5 response to a value of a first attribute of said set of one or more attributes.
6

1 21. The computer program product of claim 15 wherein said step of logging said user
2 into one or more data processing services includes the step of determining if a first one
3 of said data processing services requires a prerequisite service.

1 22. The computer program product of claim 21 wherein each of said corresponding
2 second predetermined LDAP schema objects has one or more predetermined attributes,
3 each of said one or more attributes having a set of one or more values, and wherein

4 determining if said first one of said data processing services requires a prerequisite
5 service is in response to a preselected value of a first one of said one or more attributes.

1 23. The computer program product of claim 15 wherein said step of logging said user
2 into one or more data processing services includes the step of determining if a first one
3 of said data processing services takes an identifier value.

1 24. The computer program product of claim 23 wherein determining if a first one of
2 said data processing services takes an identifier value is in response to a fourth directory
3 entry, said fourth directory entry representing a data structure in accordance with a
4 corresponding fourth predetermined LDAP schema object.

1 25. The computer program product of claim 24 wherein said fourth predetermined
2 LDAP schema object has one or more predetermined attributes, each of said one or more
3 attributes having a set of one or more values, and wherein determining if said first one of
4 said data processing services takes an identifier value is in response to a preselected value
5 of a first one of said one or more attributes.

1 26. The computer program product of claim 25 further comprising the step of invoking
2 an initialization routine corresponding to said first data processing service in response to
3 an attribute value in a third directory entry corresponding to said first data processing
4 service, said third directory entry representing a data structure in accordance with a
5 corresponding third predetermined LDAP schema object, said initialization routine being

1 29. A data processing system for global sign-on (GSO) comprising:
2 circuitry operable for receiving a user login;
3 circuitry operable for determining an existence of a first directory entry
4 corresponding to said user in response to a first Lightweight Directory Access Protocol
5 (LDAP) message; and
6 circuitry operable for logging said user into one or more data processing services
7 in response to one or more second directory entries, and wherein each of said first and
8 second directory entries represents a data structure in accordance with a corresponding
9 first and second predetermined LDAP schema object.

1 30. The data processing system of claim 29 wherein each of said corresponding
2 second predetermined LDAP schema objects has one or more predetermined attributes,
3 each of said one or more attributes having a set of one or more values, and wherein a first
4 one of said plurality of attributes is operable for initiating a corresponding one of said data
5 processing services.

1 31. The data processing system of claim 30 wherein said circuitry operable for logging
2 said user into one or more data processing systems is operable in response to first one of
3 said plurality of attributes having a first predetermined data value.

1 32. The data processing system of claim 29 wherein said circuitry operable for logging
2 said user into said one or more data processing services comprises:
3 circuitry operable for, for each data processing service, reading a user identifier
4 (UID) and a password from a corresponding one of said second directory entries; and

5 circuitry operable for logging in said user using said UID and said password.

1 33. The data processing system of claim 29 further comprising circuitry operable for
2 starting said one or more data processing services in response to one or more third
3 directory entries, each of said third directory entries representing a data structure in
4 accordance with a corresponding third predetermined LDAP schema object.

1 34. The data processing system of claim 33 further comprising circuitry operable for
2 invoking an initialization routine corresponding to each of said data processing services,
3 wherein each of said corresponding third predetermined LDAP schema objects includes
4 a set of one or more attributes, and wherein said initialization routine is determined in
5 response to a value of a first attribute of said set of one or more attributes.

1 35. The data processing system of claim 29 wherein said circuitry operable for logging
2 said user into one or more data processing services includes circuitry operable for
3 determining if a first one of said data processing services requires a prerequisite service.
4

1 36. The data processing system of claim 35 wherein each of said corresponding
2 second predetermined LDAP schema objects has one or more predetermined attributes,
3 each of said one or more attributes having a set of one or more values, and wherein
4 determining if said first one of said data processing services requires a prerequisite service
5 is in response to a preselected value of a first one of said one or more attributes.

1 37. The data processing system of claim 29 wherein said circuitry operable for logging
2 said user into one or more data processing services includes circuitry operable for
3 determining if a first one of said data processing services takes an identifier value.

1 38. The data processing system of claim 37 wherein said circuitry operable for
2 determining if a first one of said data processing services takes an identifier value is
3 operable in response to a fourth directory entry, said fourth directory entry representing
4 a data structure in accordance with a corresponding fourth predetermined LDAP schema
5 object.

1 39. The data processing system of claim 38 wherein said fourth predetermined LDAP
2 schema object has one or more predetermined attributes, each of said one or more
3 attributes having a set of one or more values, and wherein determining if said first one of
4 said data processing services takes an identifier value is in response to a preselected value
5 of a first one of said one or more attributes.

1 40. The data processing system of claim 39 further comprising circuitry operable for
2 invoking an initialization routine corresponding to said first data processing service in
3 response to an attribute value in a third directory entry corresponding to said first data
4 processing service, said third directory entry representing a data structure in accordance
5 with a corresponding third predetermined LDAP schema object, said initialization routine
6 being determined in response to said attribute value, and wherein said identifier value is
7 passed to said initialization routine.

1 41. The data processing system of claim 37 wherein said identifier value is a required
2 identifier value.

1 42. The data processing system of claim 37 wherein said identifier value is an optional
2 identifier value.

Appendix A - Object Class Tables

Class	<i>eGSOuser</i>
Description	Contains GSO user specific information
Type	structural
OID	1.3.18.0.2.6.27
Derived from	eUser
Auxiliary Classes	
Possible Superiors	person, organizationalPerson, inetOrgPerson, residentialPerson, liPerson, ePerson, container
Must Contain	cn[RDN], userType, userState
Inherited Must Contain	
May Contain	associatedName, subadminGroup, targetGroup
Inherited May Contain	caption, description, principalName, userCertificate, configPtr, accessHint, accountHint
<p>Additional Description:</p> <p>The <i>eGSOuser</i> object is structurally always "below" an "<i>ePerson</i>" and represents the association between a person object and GSO, when that person is configured to be a GSO user. The <i>eGSOuser</i> object contains specific GSO information associated with that user and is also used as an anchor point to which the GSO user's target information is attached. If a GSO user is being created and no <i>ePerson</i> object yet exists in the namespace for that person, GSO will create an <i>ePerson</i> (<i>inetOrgPerson</i> and <i>ePerson</i> auxiliary class) for that new person and will populate only the <i>cn</i>, <i>sn</i> and <i>userPassword</i> attributes. When a "GSO user" is deleted, the <i>eGSOuser</i> subtree will be removed from the <i>ePerson</i> object (breaking the association between the person and GSO). If there are no more entries "below" the <i>ePerson</i> object, the user will be given the opportunity to also delete the <i>ePerson</i> object itself, if they wish.</p>	

Class	<i>container</i>
Description	Anchor points for GSO subtrees
Type	structural
OID	1.3.18.0.2.6.28
Derived from	top
Auxiliary Classes	
Possible Superiors	any structural object
Must Contain	cn[RDN]
Inherited Must Contain	
May Contain	
Inherited May Contain	
<p>Additional Description:</p> <p>This object exists in the eNetwork common schema definition. It is included here to document its use by GSO.</p> <p>GSO maintains several anchor points (subtrees) within its GSO-specific data. All the anchor points use the container object as the anchor point object and the Common Name in the container indicates the type of GSO subtree.</p>	

Class	<i>eTargetRecord</i>
Description	Used to describe the specific target information for this GSO user.
Type	structural
OID	1.3.18.0.2.6.29
Derived from	cimSetting
Auxiliary Classes	
Possible Superiors	eGSOuser
Must Contain	cn[RDN]
Inherited Must Contain	
May Contain	uid, userPassword, tsType, accountService, targetService, targetAdapter, reqIdentifier, optIdentifier, passwordGenerator, launchable, prereqTarget, autoInitiate, autoTerminate
Inherited May Contain	caption, description, sid
<p>Additional Description:</p> <p>The <i>eTargetRecord</i> object describes the target that the GSO user may launch. It is used as the association between the user and the specific target information which applies to the target type.</p>	

Class	<i>eApplicationSystem</i> for GSO
Description	Anchor point for the GSO-specific object tree
Type	structural
OID	1.3.18.0.2.6.84
Derived from	eSystem
Auxiliary Classes	
Possible Superiors	organization, organizationalUnit, domain, eSystem (and its subclasses)
Must Contain	
Inherited Must Contain	
May Contain	hostedSoftwarePtr, osPtr
Inherited May Contain	caption, description, installDate, configPtr, systemName[RDN], nameFormat, systemRoles, primaryOwnerContact, primary OwnerName
<p>Additional Description:</p> <p>The <i>eApplicationSystem</i> for GSO is the anchor point for the remainder of the GSO-specific object tree. It is created by GSO when the product is first installed and configured. GSO then populates the remainder of its GSO-specific object tree beneath this anchor point. The "owner" of this anchor point is the GSO Senior Admin group and this ownership propagates through the rest of the GSO-specific object tree. The GSO Admin and Middle Tier server groups have access to this anchor point and this access also propagates through the remainder of the GSO-specific object tree.</p>	

Class	<i>eGSOaccount</i>
Description	Contains account information for GSO targets
Type	structural
OID	1.3.18.0.2.6.31
Derived from	eAccount
Auxiliary Classes	
Possible Superiors	Target Accounts container
Must Contain	cn[RDN]
Inherited Must Contain	uid
May Contain	accountService, otherPrincipalPtr
Inherited May Contain	caption, description, host, l, o, ou, seeAlso, userPassword, userCertificate, principalPtr
<p>Additional Description:</p> <p>The <i>eGSOaccount</i> is used by GSO to describe target account information which may be shared by multiple users or across multiple targets for a single GSO user. GSO maintains these <i>eGSOaccount</i> objects within the <i>Target Accounts</i> GSO-specific subtree. GSO defines and maintains accounts which may be shared between users and/or targets. For example, if a user defines a target of telnet to access an AIX machine and also defines a target of ftp for the same AIX machine, they would likely share the same target account information. That account information is maintained within this subtree.</p>	

Class	<i>eTargetServiceType</i>
Description	GSO Target Service Type
Type	structural
OID	1.3.18.0.2.6.32
Derived from	top
Auxiliary Classes	
Possible Superiors	Target Service Types container.
Must Contain	tsType[RDN]
Inherited Must Contain	
May Contain	caption, description, authenticationType, capability, reqIdentifierName, optIdentifierName, msgFileName
Inherited May Contain	
<p>Additional Description:</p> <p>The <i>eTargetServiceType</i> class is used to describe a type of a GSO Target Service. These objects are maintained within the GSO-specific object subtree beneath the <i>Target Service Types</i> anchor point. A Target Service Type is a class of services representing a specific type. Examples might be: Lotus Notes, Netware, 3270 etc. The <i>eTargetServiceType</i> indicates the required and optional identifiers needed to describe this Target Service Type as well as the capabilities and authentication type supported by this Target Service Type. Below this class are defined <i>eTargetService</i> objects representing specific instances of this Target Service Type as well as <i>eTargetAdapter</i> objects which describe the adapters (interface code) to access that <i>eTargetService</i> instance. In the instantiation of a specific <i>eTargetService</i>, the required and optional identifiers are specified with their values for that target. The <i>eTargetAdapter</i> object represents the Java code which GSO uses to interface with that target.</p>	

Class	<i>eTargetService</i>
Description	GSO Target Service
Type	structural
OID	1.3.18.0.2.6.33
Derived from	top
Auxiliary Classes	
Possible Superiors	eTargetServiceType
Must Contain	tsName[RDN], tsType
Inherited Must Contain	
May Contain	caption, description, authenticationType, reqIdentifier, optIdentifier
Inherited May Contain	
<p>Additional Description:</p> <p>The <i>eTargetService</i> class is used to describe a specific instance of a GSO Target Service Type. These objects are maintained within the GSO-specific object subtree beneath a defined <i>TargetServiceType</i>. An <i>eTargetService</i> is a class describing a specific instance of an <i>eTargetServiceType</i>. Examples might be: Lotus Notes, Netware, 3270 to AUSVMR, etc. This is an instantiation of a specific Target Service Type and would have the values for the required and optional identifiers (as indicated in the <i>eTargetServiceType</i>) specified.</p>	

Class	<i>eTargetAdapter</i>
Description	GSO Target Adapter
Type	structural
OID	1.3.18.0.2.6.34
Derived from	top
Auxiliary Classes	
Possible Superiors	eTargetServiceType.
Must Contain	taName[RDN], tsType, javaClassName
Inherited Must Contain	
May Contain	caption, description, jarFileName, osType, propertyType, msgFileName
Inherited May Contain	
<p>Additional Description:</p> <p>The <i>eTargetAdapter</i> class is used to describe the interface code which GSO uses to access the specified target. These objects are maintained within the GSO-specific object subtree beneath a specified <i>eTargetServiceType</i>. The <i>eTargetAdapter</i> is the Java interface code which GSO will invoke via the Dynamic Target Interface to access the specified target. The Target Adapter code is either the client itself (in the case of a pure Java client such as Host on Demand), or it interfaces with the client code such as a command line executable or native code.</p>	

Class	<i>eGSOattachment</i>
Description	GSO attachment to contain or describe additional files or data that are needed.
Type	structural
OID	1.3.18.0.2.6.35
Derived from	eProperty
Auxiliary Classes	
Possible Superiors	eTargetRecord, eTargetService, eTargetAdapter, eGSOMachineProfile.
Must Contain	propertyType[RDN]
Inherited Must Contain	
May Contain	
Inherited May Contain	caption, description, cisPropertyType, cesPropertyType, binPropertyType, cisProperty, cesProperty, binProperty
<p>Additional Description:</p> <p>The <i>eGSOattachment</i> class is used by GSO to provide additional data relevant to a specific Target Record, Target Service Type, Target Adapter or Machine Profile. The attachment data is usually additional files or information needed by the target or machine. For example, for a Lotus Notes target, the notes.ini file is required. These objects are maintained within the GSO-specific object subtree beneath a specified <i>eTarget Record</i>, <i>eTargetServiceType</i>, <i>eTargetAdapter</i> or beneath the <i>eGSOMachineProfile</i>.</p>	

Class	<i>eComputerSystem</i>
Description	Based on CIM_ComputerSystem, this structural class represents a computer system or "class" of machines.
Type	structural
OID	1.3.18.0.2.6.36
Derived from	eSystem
Auxiliary Classes	
Possible Superiors	organization, organizationalUnit, domain, eSystem (and its subclasses)
Must Contain	
Inherited Must Contain	
May Contain	location, hostname[RDN]
Inherited May Contain	caption, description, installDate, configPtr, systemName, nameFormat, systemRoles, primaryOwnerContact, primaryOwnerName
<p>Additional Description:</p> <p>The <i>eComputersystem</i> is used to represent either a single computer system or a "class" of computer systems. If this object does not yet exist when a computer system is defined by GSO, it will be created. Below this object, GSO will create an <i>eSoftware</i> for GSO objet to represent GSO-specific aspects of this computer system, below which will be the <i>eGSOMachineProfile</i> object to contain the GSO-specific machine information.</p>	

Class	<i>eSoftware</i> for GSO.
Description	Based on CIM, this structural class is used to represent instances of software on a machine.
Type	structural
OID	1.3.18.0.2.6.86
Derived from	cimLogicalElement
Auxiliary Classes	
Possible Superiors	eCompuerSystem, eSystem
Must Contain	
Inherited Must Contain	
May Contain	
Inherited May Contain	caption, description, installDate, configPtr, software[RDN], vendor, identifyingNumber, version, softwareElementState, softwareElementID, osType, other OSTypeDescription, manufacturer, buildNumber, serialNumber, codeSet, identificationCode, languageEdition, labeledURI, localPath, supportingFiles, applSystemHint, applSoftwareHint
<p>Additional Description:</p> <p>The <i>eSoftware</i> for GSO object is used to form a subtree of GSO-specific information about this computer system. The <i>software</i> attribute is set to "GSO". For GSO, a computer system can represent either a single computer system or a "class" of computer systems. If this object does not yet exist when a computer system is defined by GSO, it will be created beneath the <i>eComputersystem</i> object. Below the <i>eSoftware</i> object, GSO will create an <i>eGSOMachineProfile</i> object to represent GSO-specific aspects of this computer system.</p>	

Class	<i>eGSOMachineProfile</i>
Description	Used to contain GSO-specific information about this computer system.
Type	structural
OID	1.3.18.0.2.6.38
Derived from	top
Auxiliary Classes	
Possible Superiors	eSoftware for GSO
Must Contain	cn[RDN], osType
Inherited Must Contain	
May Contain	caption, description, reqIdentifier
Inherited May Contain	
<p>Additional Description:</p> <p>The <i>eGSOMachineProfile</i> is used by GSO to describe GSO-specific information about this computer system. For GSO, a computer system can represent either a single computer system or a "class" of computer systems. Below the <i>eGSOMachineProfile</i>, GSO may have <i>eGSOattachment</i> objects which represent GSO machine-specific files or locations of files for targets. The reqIdentifier attribute can be used to override GSO target service information which is specific to this computer system.</p>	

Class	<i>ePasswordGenerator</i>
Description	Used to describe a GSO Password Generator.
Type	structural
OID	1.3.18.0.2.6.39
Derived from	top
Auxiliary Classes	
Possible Superiors	Password Generators container
Must Contain	cn[RDN], secretKey
Inherited Must Contain	
May Contain	caption, description, member
Inherited May Contain	
Special Notes	
<p>Additional Description:</p> <p>The <i>ePasswordGenerator</i> object is used by GSO to describe the information needed for a specific Password Generator. This object is within the GSO-specific object subtree beneath the Password Generators container anchor point. The GSO Password Generator objects describe the generator information used for those targets (such as 3270 passticket) which are configured to use a generated password instead of a fixed password. Only GSO Senior Administrators are allowed to create or modify Password Generators and only GSO Middle Tier Servers are allowed to read the Password Generator information.</p>	

Class	<i>eObjectDescription</i>
Description	Used to describe more information about an object for usability and to indicate whether the object is required or user-editable.
Type	structural
OID	1.3.18.0.2.6.40
Derived from	top
Auxiliary Classes	
Possible Superiors	eTargetServiceType, eTargetAdapter
Must Contain	cn[RDN]
Inherited Must Contain	
May Contain	caption, description, objectClassCaption, validValues, required, editable, msgFileName
Inherited May Contain	
<p>Additional Description:</p> <p>The <i>eObjectDescription</i> object is used by GSO to describe additional information about the identifiers or attachments associated with an <i>eTargetServiceType</i> or <i>eTargetAdapter</i>. This object is within the GSO-specific object subtree beneath the Target Service Types container anchor point. The information within this object allows detailed information to be associated with these objects, for example descriptive text which can be presented to a GUI user. The object description also contains attributes used to indicate whether the object is required, or if it is editable by the user.</p>	

Class	<i>eGsoDomain</i>
Description	Used to described location identifiers and their values corresponding to an authentication domain.
Type	structural
OID	1.3.18.0.2.6.41
Derived from	top
Auxiliary Classes	
Possible Superiors	GSO Domains container.
Must Contain	cn[RDN]
Inherited Must Contain	
May Contain	caption, description, targetLocation
Inherited May Contain	
<p>Additional Description:</p> <p>The <i>eGsoDomain</i> object is used by GSO to determine the authentication Domain for a specified location string. This object is within the GSO-specific object subtree beneath the GSO Domains container anchor point. Within a multiuser networked computing environment, various authentication domains (administrative realms) may exist. These domains may be distinguished with combinations of identifiers and values for Host, Application and Application Instance. These combinations of identifiers and values are referred to as location strings. This object is used is used to configure the possible location strings valid for a given Domain. GSO uses this object to determine the authentication Domain for a specified location string, and uses that to look up a user's Target Record within that authentication Domain.</p>	

Appendix B - Attribute Tables

Attribute	<i>userType</i>
Description	Indicates the type of user. Possible values which GSO will use are: SeniorAdmin, Admin, Middle Tier Server, Full User, User
OID	1.3.18.0.2.4.123
Syntax	cis ¹ /128
Single Valued	Single Valued
Access Class	sensitive
<p>Additional Description:</p> <p>This attribute is used by GSO to track the type of GSO principal. Although this is "role-like", the types tracked are GSO specific and not managed via LDAP mechanisms. GSO administers the type of user and for performance reasons, another LDAP access should not be required to ascertain the user type.</p>	

¹CIS = case ignore string

Attribute	<i>userState</i>
Description	Indicates the current state for the user. GSO possible values are: Enabled, Disabled
OID	1.3.18.0.2.4.124
Syntax	cis/128
Single Valued	Single Valued
Access Class	sensitive
Additional Description: This attribute is used to track the state for the principal. GSO uses this attribute to indicate whether the GSO user information is currently enabled or disabled. This allows the GSO user to be inactivated and not have to delete the definition.	

Attribute	<i>subadminGroup</i>
Description	Indicates the subadministration groups to which this GSO principal belongs.
OID	1.3.18.0.2.4.125
Syntax	dn/1000
Single Valued	Multi-Valued
Access Class	sensitive
Additional Description: This attribute is used to track the subadministration groups to which this GSO user belongs.	

Attribute	<i>targetGroup</i>
Description	Indicates the Target Groups to which this GSO principal belongs.
OID	1.3.18.0.2.4.126
Syntax	dn/1000
Single Valued	Multi-Valued
Access Class	sensitive
Additional Description: This attribute is used to track the Target Groups to which this GSO user belongs.	

Attribute	<i>prereqTarget</i>
Description	Indicates a list of targets which are prerequisites of this target.
OID	1.3.18.0.2.4.127
Syntax	dn/1000
Single Valued	Multi-Valued
Access Class	normal
Additional Description: This attribute is used to indicate a list of targets which are prerequisites of this target. This allows targets to be started prior to this target, if the other targets are required to be running before this target can be launched.	

Attribute	<i>autoInitiate</i>
Description	Indicates that this target should be started/launched when the GSO user logs on.
OID	1.3.18.0.2.4.128
Syntax	boolean
Single Valued	Single-Valued
Access Class	normal
Additional Description: This attribute appears in an <i>eTargetRecord</i> object and indicates whether this target should be started/launched when the GSO user logs on.	

Attribute	<i>autoTerminate</i>
Description	Indicates that this target should be stopped when the GSO user logs off.
OID	1.3.18.0.2.4.129
Syntax	boolean
Single Valued	Single-Valued
Access Class	normal
Additional Description: This attribute appears in an <i>eTargetRecord</i> object and indicates whether this target should be stopped when the GSO user logs off.	

Attribute	<i>accountService</i>
Description	Indicates the service which is used to manage the target account.
OID	1.3.18.0.2.4.130
Syntax	dn/1000
Single Valued	Single-Valued
Access Class	normal
Additional Information: This attribute is used to indicate the Target Service which manages the account for this GSO target. This allows the account service to be different than the target type itself. For example, the target type might use telnet to access an AIX machine, but the service which manages the account may be DCE, when integrated login is in effect.	

Attribute	<i>targetService</i>
Description	Indicates the target service instance.
OID	1.3.18.0.2.4.131
Syntax	dn/1000
Single Valued	Single-Valued
Access Class	normal
Additional Information: This attribute is used to indicate the Target Service instance for this GSO target.	

Attribute	<i>tsType</i>
Description	Indicates the target service type.
OID	1.3.18.0.2.4.132
Syntax	cis/128
Single Valued	SingleValued
Access Class	normal
Additional Description: This attribute is used to indicate the type of Target Service used for this GSO target.	

Attribute	<i>targetAdapter</i>
Description	Indicates the specific target adapter to use for this GSO target.
OID	1.3.18.0.2.4.133
Syntax	dn/1000
Single Valued	SingleValued
Access Class	normal
Additional Description: This attribute is used to indicate the specific Target Adapter for this GSO target. The Target Adapter is the Java interface code which GSO will invoke via the Dynamic Target Interface to access the specified target. The Target Adapter code is either the client itself (in the case of a pure Java client such as Host on Demand), or it interfaces with the client code such as a command line executable or native code.	

Attribute	<i>reqIdentifierName</i>
Description	Indicates the set of Required Identifiers needed for this specific GSO Target Service Type.
OID	1.3.18.0.2.4.134
Syntax	cis/128
Single Valued	Multi-Valued
Access Class	normal
<p>Additional Description:</p> <p>This attribute is used to identify the set of Required Identifiers for this GSO Target Service Type. The required identifiers and their values will be acquired from the specific Target Service instance used by this target or by the user's Target Record.</p>	

Attribute	<i>reqIdentifier</i>
Description	Indicates the set of Required Identifiers and their values needed for this specific GSO target.
OID	1.3.18.0.2.4.135
Syntax	cis/128
Single Valued	Multi-Valued
Access Class	normal
<p>Additional Description:</p> <p>This attribute is used to identify the set of Required Identifiers and their values for this GSO target. The required identifiers and their values will be acquired from the specific Target Service instance used by this target or from the user's Target Record.</p>	

Attribute	<i>optIdentifierName</i>
Description	Indicates the set of Optional Identifiers needed for this specific GSO target.
OID	1.3.18.0.2.4.136
Syntax	cis/128
Single Valued	Multi-Valued
Access Class	normal
Additional Description: This attribute is used to identify the set of Optional Identifiers for this GSO Target Service Type. The optional identifiers and their values will be acquired from the specific Target Service instance used by this target or the user's Target Record.	

Attribute	<i>optIdentifier</i>
Description	Indicates the set of Optional Identifiers and their values needed for this specific GSO target.
OID	1.3.18.0.2.4.137
Syntax	cis/128
Single Valued	Multi-Valued
Access Class	normal
Additional Description: This attribute is used to identify the set of Optional Identifiers and their values for this GSO target. The optional identifiers and their values will be acquired from the specific Target Service instance used by this target or from the user's Target Record.	

Attribute	<i>passwordGenerator</i>
Description	Indicates the name of the Password Generator to use for this specific GSO target.
OID	1.3.18.0.2.4.138
Syntax	dn/1000
Single Valued	Single-Valued
Access Class	critical
<p>Additional Description:</p> <p>This attribute is used to identify the Password Generator to use for this GSO target. For targets such as 3270 which have been configured to use a generated password for the target, this attribute specifies the Password Generator to use for this GSO target.</p>	

Attribute	<i>launchable</i>
Description	Indicates whether this GSO target can be started by GSO or not.
OID	1.3.18.0.2.4.139
Syntax	Boolean
Single Valued	Single-Valued
Access Class	normal
<p>Additional Description:</p> <p>This attribute is used to indicate whether a GSO target may be started via GSO or not. GSO targets described by <i>eTargetRecord</i> objects may be configured to be launchable or not.</p>	

Attribute	<i>principalPtr</i>
Description	Indicates the names of the primary GSO users for this account.
OID	1.3.18.0.2.4.319
Syntax	dn/1000
Single Valued	Multi-Valued
Access Class	normal
<p>Additional Description:</p> <p>This attribute is used to identify the GSO users who have update authority for this Target Account. This allows GSO to maintain the users of a shared account so that the account can have the appropriate access control.</p>	

Attribute	<i>otherPrincipalPtr</i>
Description	Indicates the names of the non-primary GSO users for this account.
OID	1.3.18.0.2.4.141
Syntax	dn/1000
Single Valued	Multi-Valued
Access Class	normal
<p>Additional Description:</p> <p>This attribute is used to identify the GSO users who do not have update authority for this Target Account. This allows GSO to maintain the users of a shared account so that the account can have the appropriate access control.</p>	

Attribute	<i>tsName</i>
Description	Used to specify the name of an <i>eTargetService</i> object.
OID	1.3.18.0.2.4.142
Syntax	cis/128
Single Valued	
Access Class	normal
<p>Additional Description:</p> <p>This attribute is used to name an <i>eTargetService</i> object. GSO allows the user to specify the name of a Target Service, which is an instance of a specific Target Service Type.</p>	

Attribute	<i>taName</i>
Description	Used to specify the name of an <i>eTargetAdapter</i> object.
OID	1.3.18.0.2.4.143
Syntax	cis/128
Single Valued	
Access Class	normal
<p>Additional Description:</p> <p>This attribute is used to name an <i>eTargetAdapter</i> object. GSO allows the user to specify the name of a Target Adapter, which describes the Java interface code to access the Target Service.</p>	

Attribute	<i>authenticationType</i>
Description	Indicates the type of authentication used by this GSO Target Service. GSO specifies multiple possible values of: "Password", Passticket", "Fingerprint," "Smartcard", "Tokencard"
OID	1.3.18.0.2.4.144
Syntax	cis/128
Single Valued	Multi-Valued
Access Class	normal
Additional Description: This attribute is used to identify the type of authentication used by this GSO Target Service. Typical values are "Password" when a password is used or "Passticket" when a generated passticket is used.	

Attribute	<i>capability</i>
Description	Indicates the capabilities this GSO Target Service Type allows.
OID	1.3.18.0.2.4.145
Syntax	cis/128
Single Valued	Multi-Valued
Access Class	normal
<p>Additional Description:</p> <p>This attribute is used to identify the set of capabilities this GSO Target Service Type allows. Example values are: "login", "logoff", "change password", "start", "stop", etc. Because GSO supports dynamically defined targets and capabilities, this list may grow or shrink based on the specific Target Service Type.</p>	

Attribute	<i>javaClassName</i>
Description	Indicates the name of the Java class which supports the GSO Dynamic Target Interface which GSO will use to access the target.
OID	1.3.18.0.2.4.146
Syntax	ces ² /256
Single Valued	Single Valued
Access Class	normal
<p>Additional Description:</p> <p>This attribute is used to indicate the Java class name which GSO will use to access the specific target. The class name specified must support the GSO Dynamic Target Interface. If the class specified is within a jar file, the jar file name should be specified using the <i>jarFileName</i> attribute.</p>	

²CES = case exact string

Attribute	<i>jarFileName</i>
Description	Indicates the name of the Java jar file which contains the Target Adapter class which supports the GSO Dynamic Target Interface which GSO will use to access the target.
OID	1.3.18.0.2.4.147
Syntax	ces/256
Single Valued	Single Valued
Access Class	normal
<p>Additional Description:</p> <p>This attribute is used to indicate the Java jar file name which contains the java class which GSO will use to access the specific target. The Java class name must be specified in the <i>java className</i> attribute within the <i>targetAdapter</i> object. The class name specified must support the GSO Dynamic Target Interface.</p>	

Attribute	<i>msgFileName</i>
Description	Indicates the name of the message file which contains message strings used for displayable attributes (such as capability, objectClassCaption, validValues, etc.
OID	1.3.18.0.2.332
Syntax	ces/256
Single Valued	Single Valued
Access Class	normal
<p>Additional Description:</p> <p>This attribute is used to indicate a message file name which contains displayable/translatable strings for those attributes which are displayable. GSO uses this attribute in the <i>eTargetServiceType</i> and <i>eTargetAdapter</i> objects. The <i>eTargetServiceType</i> object contains the capability attribute which lists the capabilities of the Target Service Type. Both the <i>eTargetServiceType</i> and <i>eTargetAdapter</i> objects may have an associated <i>eObjectDescription</i> object which contains attributes for <i>objectClassCaption</i> and <i>validValues</i>. Both of those attributes indicate displayable strings. GSO stores the message keys in the displayable attributes and uses those keys to retrieve the proper displayable message string from the message file specified by the <i>msgFilename</i> attribute.</p>	

Attribute	<i>propertyType</i>
Description	Indicates the type of GSO attachment.
OID	1.3.18.0.2.4.320
Syntax	cis/128
Single Valued	Multi-Valued
Access Class	normal
<p>Additional Description:</p> <p>This attribute indicates the types of attachments which may be attached to <i>targetRecords</i>, <i>targetServices</i>, <i>targetAdapters</i> or <i>machineProfiles</i>. GSO uses attachment objects to contain and describe extra files and information necessary for targets and machines.</p>	

Attribute	<i>cisPropertyType</i>
Description	Indicates the type of data contained in a <i>cisProperty</i> .
OID	1.3.18.0.2.4.310
Syntax	cis/128
Single Valued	Multi-Valued
Access Class	normal
<p>Additional Description:</p> <p>This attribute indicates the type of data contained in a GSO attachment which may be attached to <i>eTargetRecords</i>, <i>eTargetServices</i>, <i>eTargetAdapters</i> or <i>eGSOmachineProfiles</i>. GSO uses attachment objects to contain and describe extra files and information necessary for targets and machines.</p>	

Attribute	<i>cesPropertyType</i>
Description	Indicates the type of data contained in a <i>cesProperty</i> .
OID	1.3.18.0.2.4.308
Syntax	cis/128
Single Valued	Multi-Valued
Access Class	normal
Special Notes	
<p>Additional Description:</p> <p>This attribute indicates the type of data contained in a GSO attachment which may be attached to <i>eTargetRecords</i>, <i>eTargetServices</i>, <i>eTargetAdapters</i> or <i>eGSOmachineProfiles</i>. GSO uses attachment objects to contain and describe extra files and information necessary for targets and machines.</p>	

Attribute	<i>cisProperty</i>
Description	This attribute contains the data within a GSO attachment.
OID	1.3.18.0.2.4.309
Syntax	cis/250000
Single Valued	Multi-Valued
Access Class	normal
<p>Additional Description:</p> <p>This attribute contains the actual non-binary data within an <i>eGSOattachment</i>. The type of data is indicated by the <i>cisPropertyType</i> attribute within the <i>eGSOattachment</i> object. GSO uses <i>eGSOattachment</i> objects to contain and describe extra files and information necessary for targets and machines.</p>	

Attribute	<i>cesProperty</i>
Description	This attribute contains the data within a GSO attachment.
OID	1.3.18.0.2.4.307
Syntax	ces/250000
Single Valued	Multi-Valued
Access Class	normal
<p>Additional Description:</p> <p>This attribute contains the actual non-binary data within an <i>eGSOattachment</i>. The type of data is indicated by the <i>cesPropertyType</i> attribute within the <i>eGSOattachment</i> object. GSO uses <i>eGSOattachment</i> objects to contain and describe extra files and information necessary for targets and machines.</p>	

Attribute	<i>binPropertyType</i>
Description	This attribute indicates the type of data within the <i>binProperty</i> attribute.
OID	1.3.18.0.2.4.306
Syntax	cis/128
Single Valued	Multi-Valued
Access Class	normal
Additional Description: This attribute indicates the type of binary data within an <i>eGSOattachment</i> .	

Attribute	<i>binProperty</i>
Description	This attribute contains the binary data within the <i>eGSOattachment</i> .
OID	1.3.18.0.2.4.305
Syntax	bin/250000
Single Valued	Multi-Valued
Access Class	normal
Additional Description: This attribute contains the binary data within an <i>eGSOattachment</i> . The type of the data is indicated by the <i>binPropertyType</i> attribute. This attribute can contain any sort of binary data which a GSO target may require when it is launched or an action (such as logon, logoff, change password, etc.) is performed.	

Attribute	<i>secretKey</i>
Description	This attribute contains an encrypted key used in the generation of a passticket or password.
OID	1.3.18.0.2.4.155
Syntax	ces/256
Single Valued	Single-Valued
Access Class	password
Additional Description: This attribute contains an encrypted key used in the generation of a passticket or password. The mechanism used for the encryption is application specific and may be indicated within the key itself. For example, the key may be specified as: "{SHA}encryptedpassword" where {SHA} indicates the mechanism used to encrypt the password.	

Attribute	Key
Description	This attribute contains a key (stored in clear text) used in the generation of a passticket or password.
OID	1.3.18.0.2.4.156
Syntax	ces/256
Single Valued	Single-Valued
Access Class	password
Additional Description: This attribute contains a clear text key used in the generation of a passticket or password.	

Attribute	<i>keyLocation</i>
Description	This attribute contains an indication of where a key is to be found which can be used in the generation of a passticket or password. The location is represented in string format and can be used however the application wishes to indicate the key location (such as a DN string, file name, label in a table etc.)
OID	1.3.18.0.2.4.157
Syntax	ces/256
Single Valued	Single-Valued
Access Class	password
<p>Additional Description:</p> <p>This attribute contains a string which represents the location of a key used in the generation of a passticket or password. The application determines the meaning of this location string.</p>	

Attribute	<i>objectClassCaption</i>
Description	This attribute is used to associate a textual label with an object for display to an end user.
OID	1.3.18.0.2.4.158
Syntax	cis/128
Single Valued	Single-Valued
Access Class	normal
Additional Description: This attribute is used to provide a textual label for an object which can be displayed to an end user.	

Attribute	<i>validValues</i>
Description	This attribute is used to contain possible values for an object.
OID	1.3.18.0.2.4.159
Syntax	cis/128
Single Valued	Multi-Valued
Access Class	normal
Additional Description: This attribute is used to contain possible values for an object. This can provide a possible range allowed for an object or identifier for example. This information can be used for display to an end user.	

Attribute	<i>required</i>
Description	This attribute is used to indicate whether an object or attribute is required or not.
OID	1.3.18.0.2.4.160
Syntax	boolean
Single Valued	Single-Valued
Access Class	normal
Additional Description: This attribute is used to indicate whether an identifier is required or not.	

Attribute	<i>editable</i>
Description	This attribute is used to indicate whether an object or attribute is user editable or not.
OID	1.3.18.0.2.4.161
Syntax	boolean
Single Valued	Single-Valued
Access Class	normal
Additional Description: This attribute is used to indicate whether an identifier is user editable or not.	

Attribute	<i>targetLocation</i>
Description	This attribute is used to indicate a set of location strings to be used to determine which strings correspond to an authentication Domain.
OID	1.3.18.0.2.4.162
Syntax	cis/128
Single Valued	Multi-Valued
Access Class	normal
Additional Information: This attribute is used to contain the set of valid location strings within an authentication Domain.	

Attribute	<i>osType</i>
Description	CIM-derived attribute indicting type of operating system.
OID	1.3.18.0.2.4.403
Syntax	integer/11
Single Valued	Single-Valued
Access Class	normal

Attribute	<i>software</i>
Description	Identifies software object entries.
OID	1.3.18.0.2.4.327
Syntax	cis/256
Single Valued	
Access Class	normal

OPEN ARCHITECTURE GLOBAL SIGN ON
APPARATUS AND METHOD THEREFOR

5 ABSTRACT OF THE DISCLOSURE

A global sign-on mechanism (GSO) is implemented. The mechanism provides a GSO system and method for a networked data processing system within an open architecture framework. The system and method are constructed on a Lightweight Directory Access Protocol (LDAP) framework by defining a set of data structures, the GSO LDAP schema. GSO functionality is effected using protocol operations on the LDAP object and attribute instances as defined in accordance with the GSO schema.

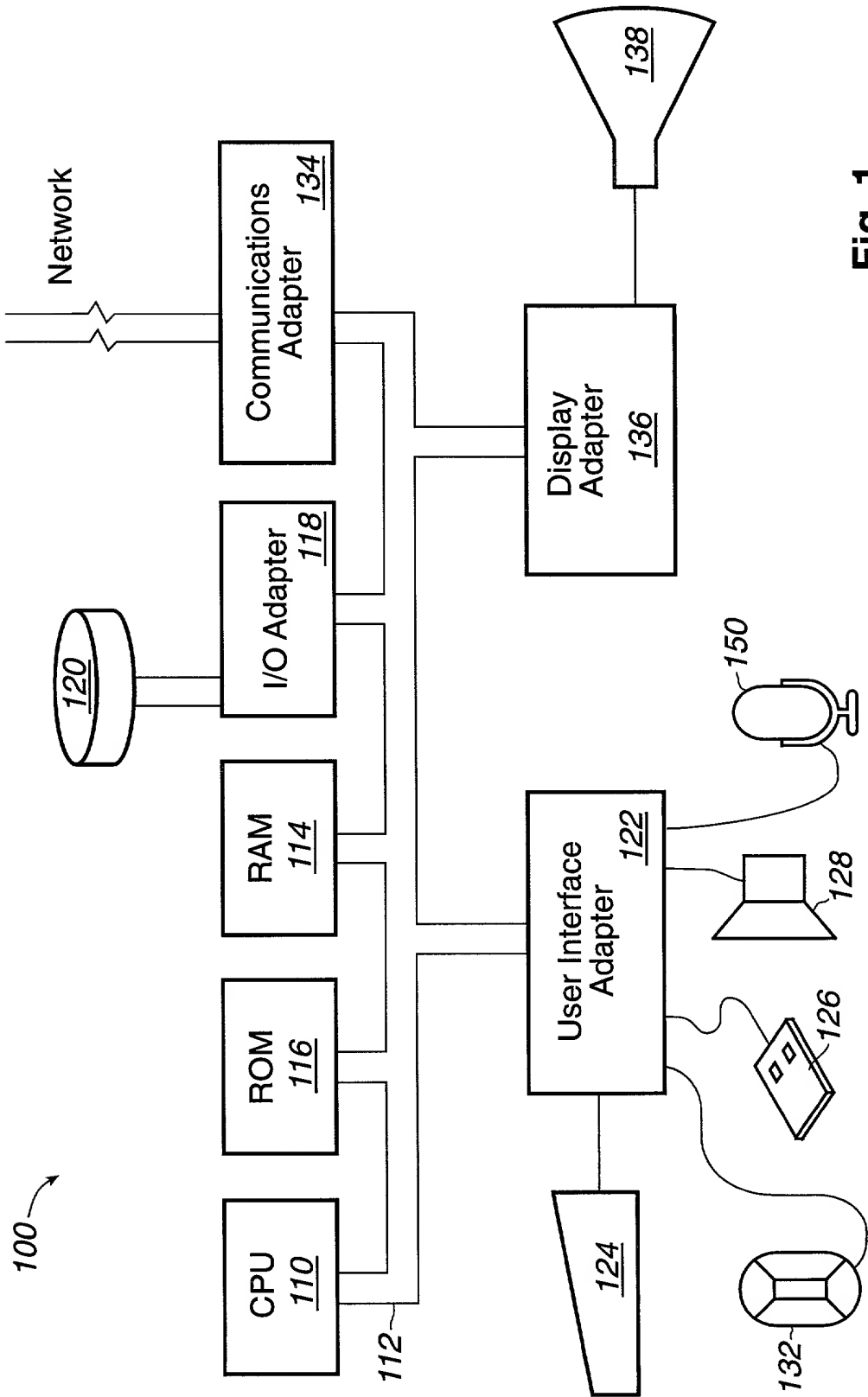


Fig. 1

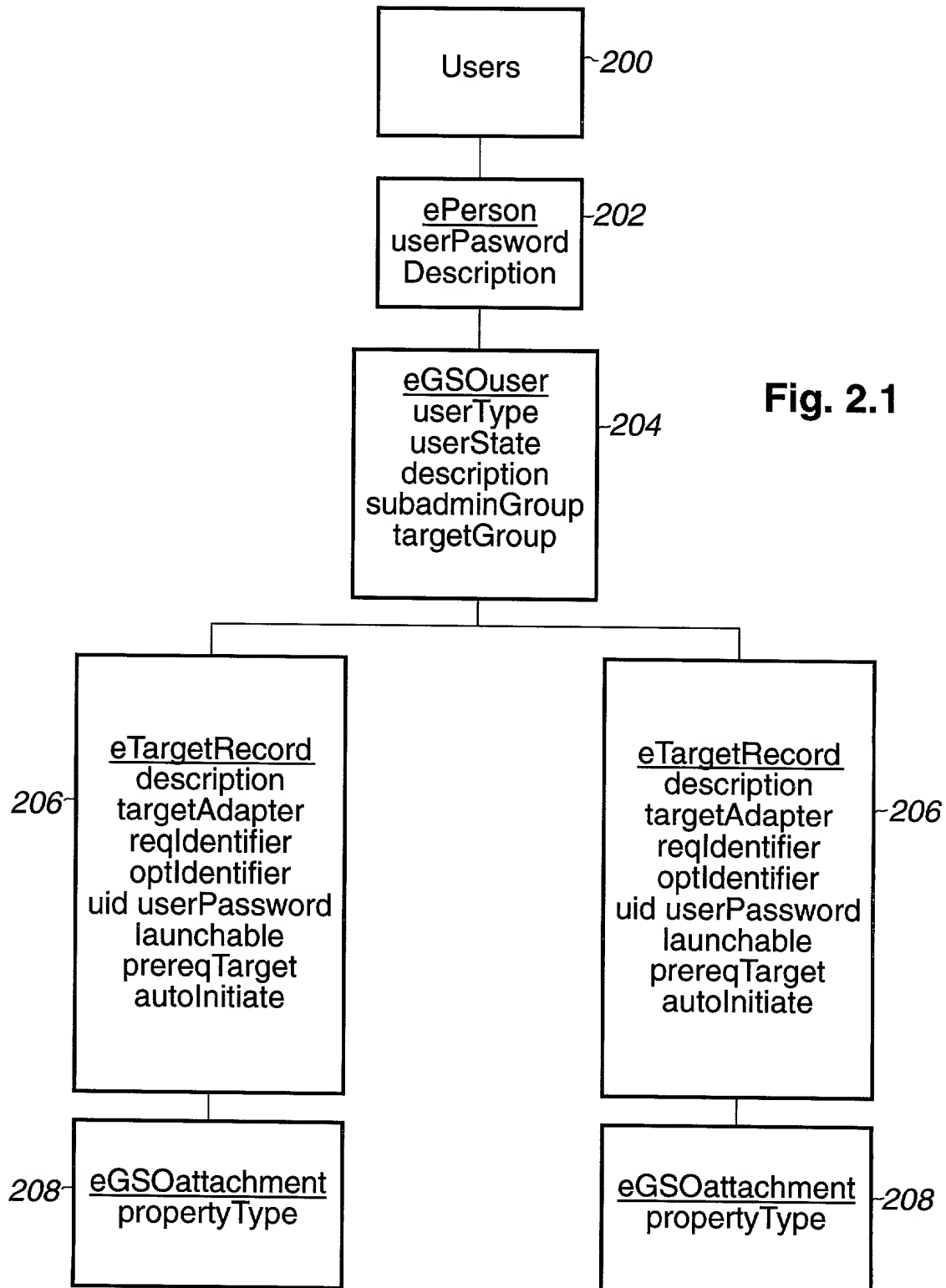


Fig. 2.1

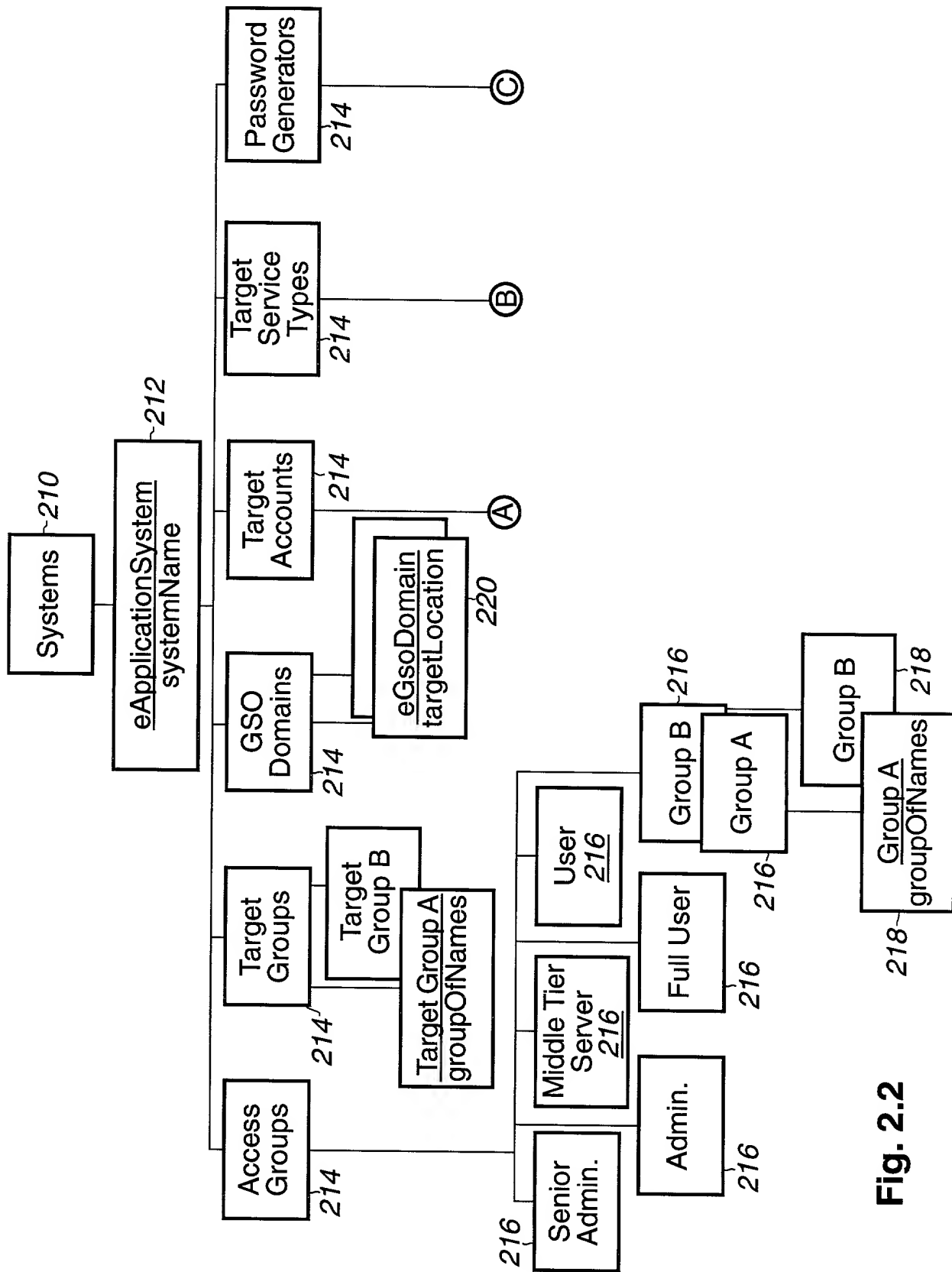


Fig. 2.2



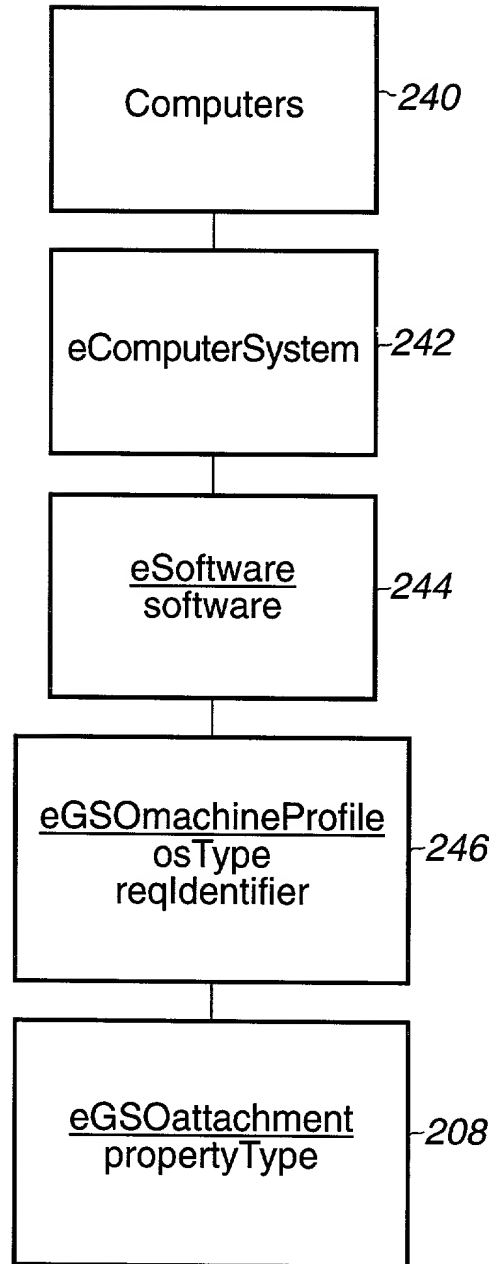


Fig. 2.3

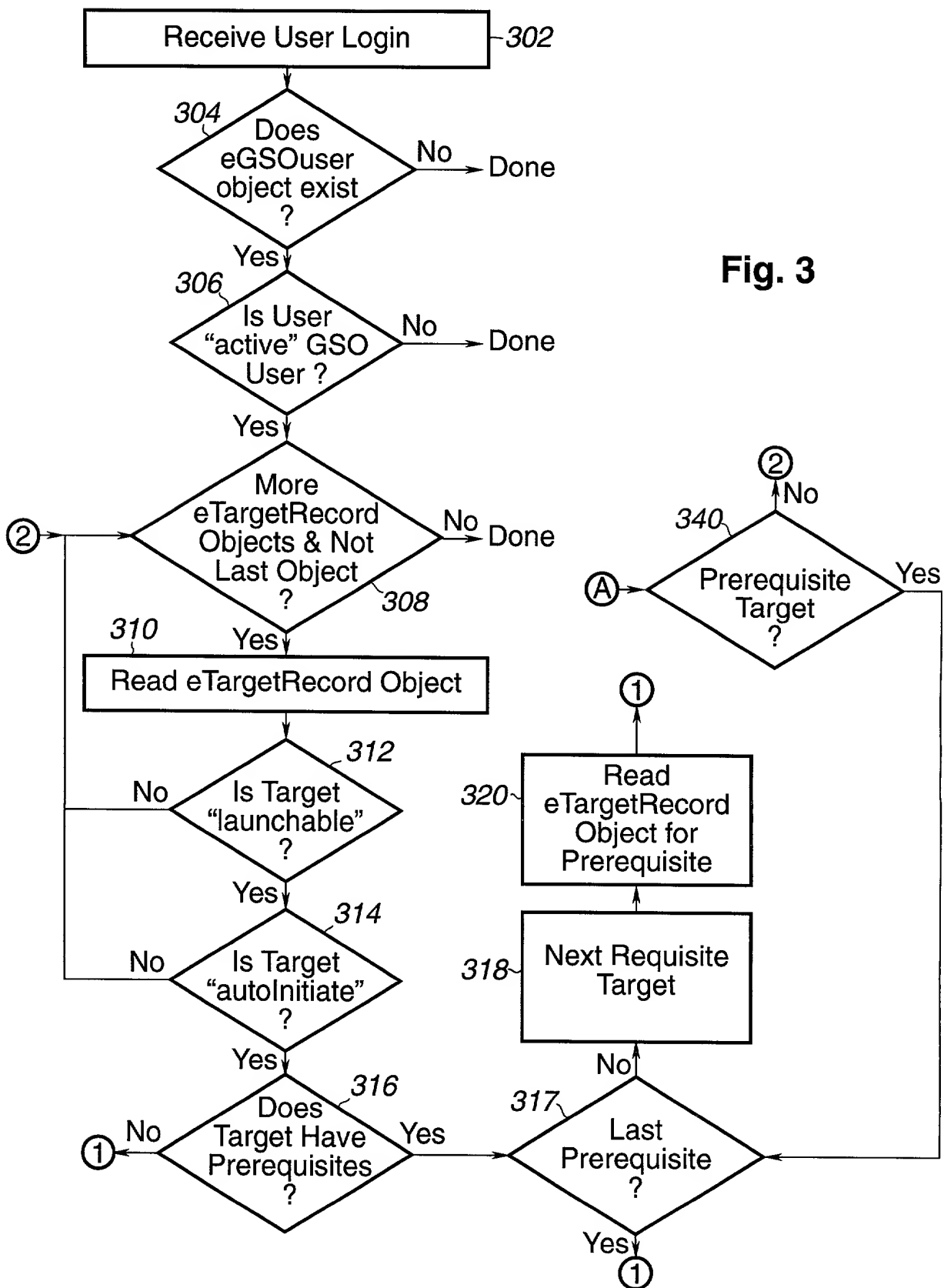


Fig. 3

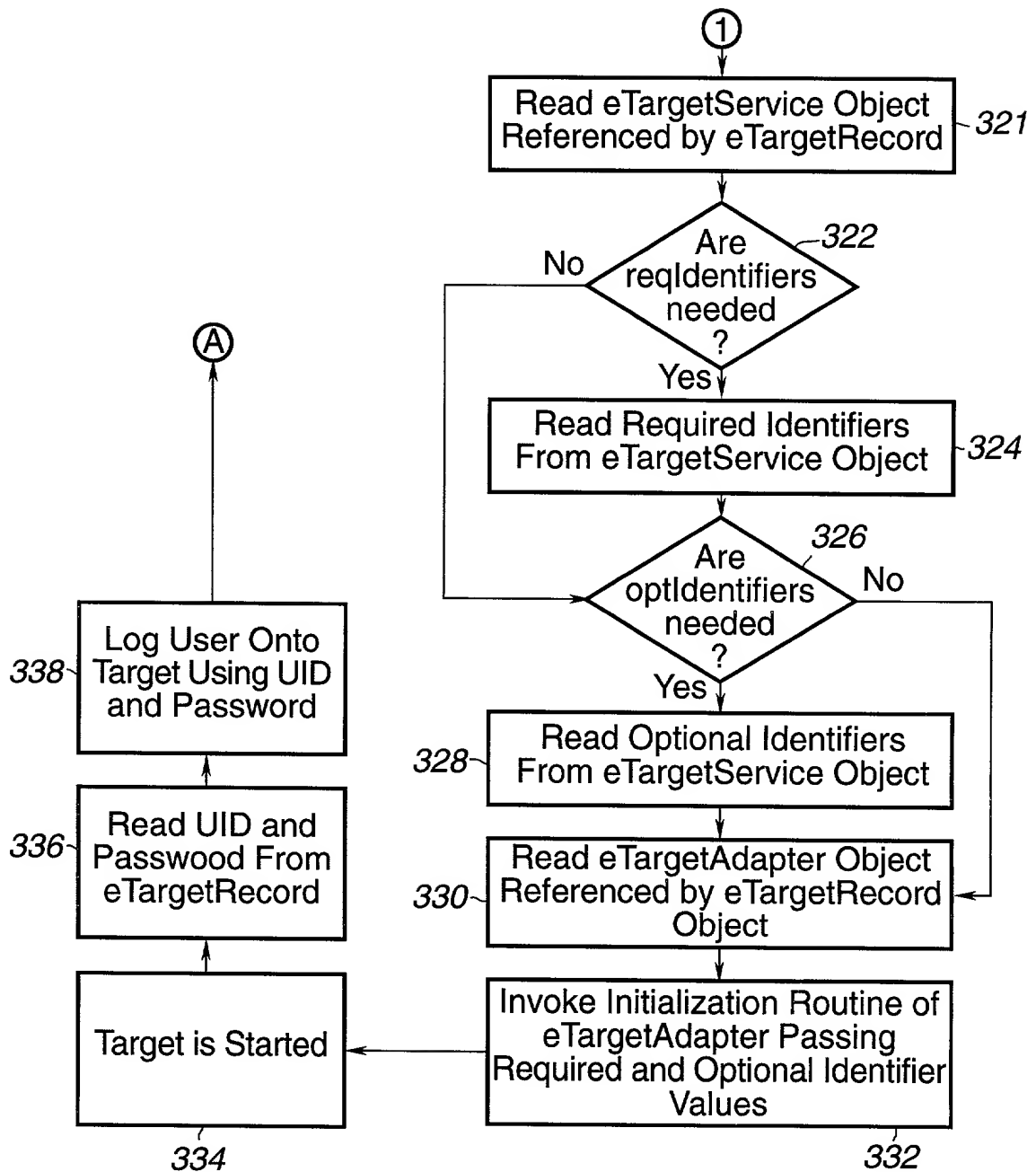


Fig. 3
(con't)

**DECLARATION AND POWER OF ATTORNEY FOR
PATENT APPLICATION**

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name;

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled

**OPEN ARCHITECTURE GLOBAL SIGN-ON
APPARATUS AND METHOD THEREFOR**

the specification of which (check one)

- ☒ is attached hereto.
- ☐ was filed on _____
as Application Serial No. _____
and was amended on _____

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to the patentability of this application in accordance with Title 37, Code of Federal Regulations, §1.56.

I hereby claim foreign priority benefits under Title 35, United States Code, §119 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

Prior Foreign Application(s):

Priority Claimed

(Number)

(Country)

(Day/Month/Year)

☐ Yes ☐ No

I hereby claim the benefit under Title 35, United States Code, §120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, §112, I acknowledge the duty to disclose information material to the patentability of this application as defined in Title 37, Code of Federal Regulations, §1.56 which occurred between the filing date of the prior application and the national or PCT international filing date of this application:

(Application Serial #)	(Filing Date)	(Status)
------------------------	---------------	----------

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

POWER OF ATTORNEY: As a named inventor, I hereby appoint the following attorneys and/or agents to prosecute this application and transact all business in the Patent and Trademark Office connected therewith.

John W. Henderson, Jr., Reg. No. 26,907; James H. Barksdale, Jr., Reg. No. 24,091; Thomas E. Tyson, Reg. No. 28,543; Robert M. Carwell, Reg. No. 28,499; Jeffrey S. LaBaw, Reg. No. 31,633; Douglas H. Lefevre, Reg. No. 26,193; Casimer K. Salys, Reg. No. 28,900; David A. Mims, Jr., Reg. No. 32,708; Mark E. McBurney, Reg. No. 33,114; Anthony V. S. England, Reg. No. 35,129; Volel Emile, Reg. No. 39,969; Christopher A. Hughes, Reg. No. 26,914; Edward A. Pennington, Reg. No. 32,588; John E. Hoel, Reg. No. 26,279; Joseph C. Redmond, Jr., Reg. No. 18,753; Leslie A. Van Leeuwen, Reg. No. 42,196; Marilyn S. Dawkins, Reg. No. 31,140; Richard Schwartz, Reg. No. 27,227; Henry L. Ehrlich, Reg. No. 39,663; Ross S. Garsson, Reg. No. 38,150; Kelly K. Kordzik, Reg. No. 36,571; Dwayne Mason, Reg. No. 38,959; James J. Murphy, Reg. No. 34,503; Bill R. Naifeh, Reg. No. 44,962; Barry S. Newberger, Reg. No. 41,527; Charles J. Rogers, Reg. No. 38,286; and Robert C. Shaddox, Reg. No. 34,011.

Send correspondence to: Barry S. Newberger, 5400 Renaissance Tower, 1201 Elm Street, Dallas, Texas 75270-2199, and direct all telephone calls to Barry S. Newberger (512) 370-2808.

FULL NAME OF FIRST OR SOLE INVENTOR: ~~GARY L. CHILD~~ *GARRY LEE CHILD LLC*

INVENTOR'S SIGNATURE: *Garry L Child* DATE: 6/14/2000

RESIDENCE: **7005 Windridge Cove**
Austin, Travis County, Texas 78759

CITIZENSHIP: **U.S.A.**

POST OFFICE ADDRESS: **(Same as Residence)**

FULL NAME OF SECOND INVENTOR: **DAH-HAUR LIN**

INVENTOR'S SIGNATURE: *Dah-Haur Lin* DATE: 6-14-2000

RESIDENCE: **9103 Marybank Drive**
Austin, Travis County, Texas 78750

CITIZENSHIP: **U.S.A.**

POST OFFICE ADDRESS: **(Same as Residence)**

FULL NAME OF THIRD INVENTOR: **LARRY FICHTNER**

INVENTOR'S SIGNATURE: *Larry Fichtner* DATE: 6-13-2000

RESIDENCE: **7603 Napier Trail**
Austin, Texas 78729

CITIZENSHIP: **U.S.A.**

POST OFFICE ADDRESS: **(Same as Residence)**